

Big Data Intelligence HW3

2024-11-19

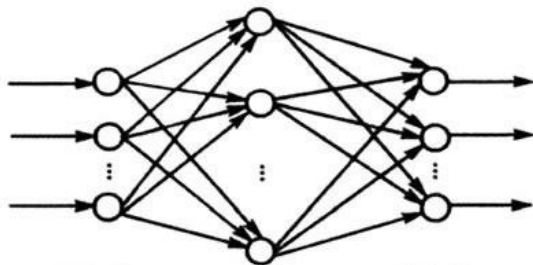
Problem Description: Handwritten Character Recognition

- Handwritten character recognition is a typical task for computer vision.
- Using the labeled handwritten character data, train a deep neural network, and evaluate it on the test handwritten characters
- Dataset: Omniglot
 - 1,623 characters in 50 different alphabet systems. There are 20 hand-written pictures for each character

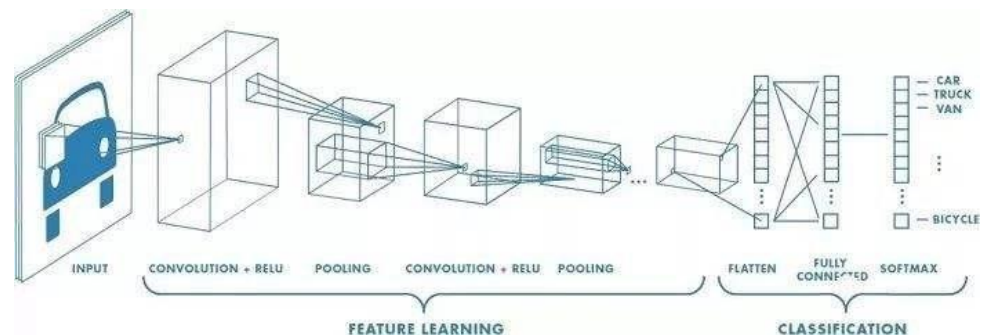


Experiment Requirements

- Split the dataset: Randomly select 50 categories from all categories for classification, and use 15 images per category as training data and 5 images as test data
- Model implementation: at least compare the performance of (a) fully connected neural networks with at least one hidden layer; (b) convolutional neural network (CNN) models



fully connected neural network



convolutional neural network

Experiment Requirements

- Try and compare your results, including but not limited to the following:
 - How does the split of the dataset influence the experimental results? (e.g., choose number of categories, number of training/testing samples, etc.)
 - How does the model influence the experimental results? (e.g. use the fully connected networks or convolutional neural network architectures, etc.)
 - How does the hyperparameters influence the experimental results? (e.g. use different initialization methods, optimizers, number of iterations, learning rates, etc.)

Note

- ❑ Submission requirements: details are in the homework material
- ❑ You can use network structures, layers, optimizers, etc., provided by machine learning frameworks such as TensorFlow/PyTorch/Keras.
- ❑ CNN baseline about 85% accuracy
- ❑ Reminder: Start early and no plagiarism !